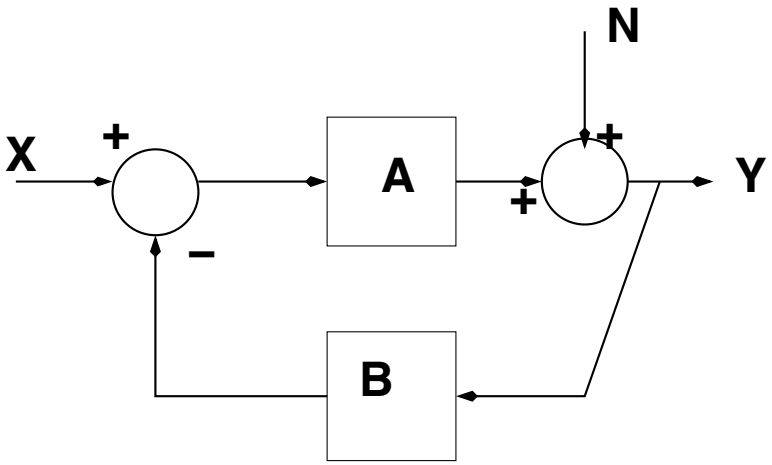
Department of Electrical and Computer Engineering
University of Massachusetts Lowell

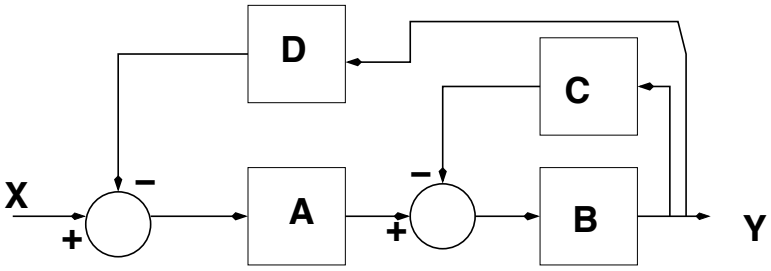
EECE4130 HW2

1.Consider the system.



a. Find the signal flow graph of the system
b. Given the $N(s) = 0$ find the transfer function $Y(s)/X(s)$
c. Given the $X(s) = 0$ find the transfer function $Y(s)/N(s)$
d. Find $Y(s)$ given that the inputs N and X are not equal to zero.

2.Consider the the system.



a. Find the SFG of the system.

b. Find $Y(s)/X(s)$

c. What is the characteristic equation of the system.,

3. The unity gain negative feedback system where the open-loop gain is equal to

$$G(s) = \frac{K}{s(s^2 + 2s + 1)(s + 2)}$$

a. Find $Y(s)/X(s)$.

b. Find the characteristic equation

c. Determine the value of K that will render the system stable.

4. Consider the characteristic equations and determine the conditions on K for stability.

a.

$$s^4 + Ks^3 + s^2 + s + 1 = 0$$

b.

$$s^4 + 2s^3 + (4 + K)s^2 + 9s + 25 = 0$$